HUMANS in the CHANNEL ISLANDS

Spatial Use Patterns Among Non-Consumptive Users of California's Channel Islands

Christopher LaFranchi
Social Science Program Coordinator, CINMS
Chris@naturalequity.com

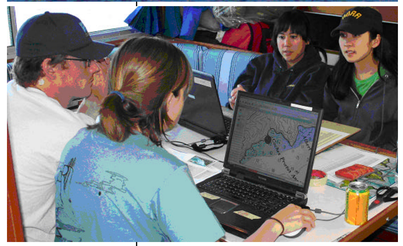
Linwood Pendleton, PhD
Associate Professor
Department of Environmental Science and Engineering
University of California at Los Angeles (UCLA)

Miwa Tamanaha
NaturalEquity

ABSTRACT

AFTER NO-TAKE MARINE RESERVES WERE APPROVED within Channel Islands National Marine Sanctuary waters in 2003, the Sanctuary and California Department of Fish and Game laid the groundwork for monitoring socioeconomic conditions that may be affected by Sanctuary policies. With the help of partners, the Sanctuary is developing a social science program that will ultimately construct a more complete picture of human-sanctuary interactions and support an MPA adaptive management process. An important aspect of socioeconomic research and monitoring is understanding the long-term effects of marine protected areas on people and sanctuary ecosystems. Do reserves help maintain productive, sustainable ecosystems that provide what humans want and need?

Human-sanctuary interactions are categorized as consumptive (e.g., fishing, spear fishing), non-consumptive (e.g., kayaking, surfing, and wildlife viewing), passive (e.g., learning about the sanctuary through reading), and education and research related (e.g., lectures and exhibits). While much data have been collected on consumptive and education/research related activities within the CINMS, there has been little formal study of non-consumptive and passive activities within the sanctuary. This study of spatial use patterns among non-consumptive users of the Sanctuary is one of the first steps towards obtaining more information on recreational boating and its associated non-consumptive activities, including diving, kayaking, surfing, and wildlife viewing.



TOP: *Private boaters at Santa Cruz Island, 2006. Photo: C. LaFranchi*

BOTTOM: *Boaters at Survey enumeration performed aboard R/V Shearwater, 2006. Photo: C. LaFranchi*

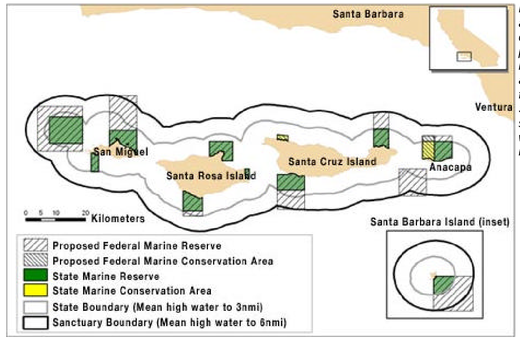
The study of spatial use patterns will provide the first data capable of supporting the management of human-sanctuary interactions at a relatively fine spatial scale, a result that is important to management of areas that are heavily used, valued, and potentially impacted ecologically, both inside and outside of MPAs. Perhaps of equal value is what is being learned from the process of developing a program for collecting fine-scale data and respectfully interacting with private boaters in the sanctuary.

In many cases, the resources that boaters seek to access during their trips to the islands are spatially distinct. A cave, a kelp bed, a surfbreak, or an underwater rock all could be specific destinations for the non-consumptive user.. Knowing the detailed spatial use patterns of sanctuary users is important to sanctuary managers. Even moving a reserve boundary a few feet in any direction can significantly impact the welfare of users. Similarly, it is important to know how and where users are likely to put pressure on sanctuary resources. For instance, if managers were to encourage anchorage use, say through the construction of a small pier, increased numbers of users may put more pressure on beaches and rocky intertidal areas.

In 2006/07, private boaters are being intercepted at anchorages in the Channel Islands and surveyed using a GIS-based, interactive computer program. We explore how spatial use patterns differ based on activities undertaken by boaters and the characteristics of the boats and boaters that anchor in the sanctuary. Further, we demonstrate how ecological and biophysical attributes of sanctuary areas influence spatial use. The research is part of a larger effort to acquire data on boaters and model their behavior in the Channel Islands.

Socioeconomic research and monitoring is relevant to several guiding principals of the California Ocean Policy Act (COPA) that emphasize recreational activities and involving the public in all aspects of the OPC process. We provide preliminary results from the spatial use patterns survey here.

Do reserves help maintain productive, sustainable ecosystems that provide what humans want and need?



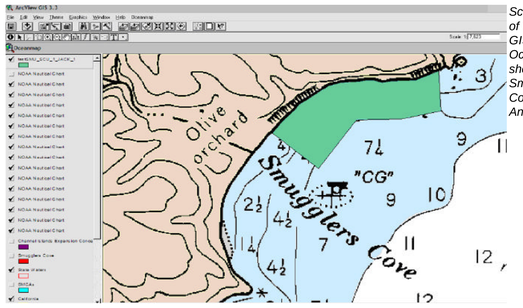
Map of study area, showing existing and proposed marine reserve areas. (Taken from the Santuary website at: ww.cinms.nos.noaa.gov)

1. SPATIAL USE STUDY AREA

The Channel Islands National Marine Sanctuary's primary goal is the protection of natural and cultural resources contained within its boundaries. Established in 1980, it encompasses 1,252 square nautical miles of Southern California waters that surround Anacapa, Santa Cruz, Santa Rosa, San Miguel, and Santa Barbara Islands. The Sanctuary extends from the mean high tide line to six nautical miles offshore and includes both California state and Federal waters. A network of ten no-take marine reserve areas was established in Sanctuary waters in 2003, in which no commercial or recreational take is allowed. Outside the marine reserves, the Sanctuary is an area of multiple use-harvesting of kelp, fish, and invertebrates is permitted.

Of 1,266 vessels observed by the Sanctuary SAMSAP program in 2005, recreational power and sailboats accounted for a third of the boats (421 observations). An additional 193 were recreational kayaks.

The Channel Islands can only be accessed by boat. Private boaters are therefore key stakeholders for the Sanctuary. Kayaking, diving, and hook and line fishing are a few of the activities enjoyed by boaters within Sanctuary waters. The value they derive from their experience in the Channel Islands, the way they are affected by Sanctuary policies, and the potential impacts of their use of the Sanctuary on Sanctuary resources are key pieces of the human-sanctuary interaction that is the focus of the Channel Islands socioeconomic monitoring program.



Screen capture of the interactive GIS program Oceanmap, showing Smuggler's Cove Anchorage.

2. METHODS

To better understand the spatial distribution of uses within anchorages we conduct in-person interviews directly at boat anchorages in the Sanctuary using an interactive GIS-based survey tool (Oceanmap) designed to collect temporal and spatial use data. The GIS-based, Oceanmap tool allows non-consumptive users (with assistance of an enumerator) to specify "freeform" spatial areas that correspond to non-consumptive uses undertaken at that anchorage.

Private boaters are intercepted and surveyed while at anchor in the sanctuary. Researchers and sanctuary staff recruit boaters from a skiff launched from the R/V Shearwater, a 62-foot aluminum catamaran.

The survey is conducted using a combination of paper survey instruments and the Oceanmap program. This interactive Oceanmap program runs on a laptop computer and allows boaters to zoom in and out on digitized nautical charts- drawing and automatically logging areas where they spend time in the sanctuary. The program makes it easy for boaters to define the spatial areas they use for diving, kayaking, wildlife viewing, dinghy exploration, and other activities. Information is also collected on characteristics of the respondent's vessel, characteristics of their trip to the islands, their activities in the Sanctuary, and demographic characteristics.

3. EXPECTED RESULTS

This study of spatial use patterns among non-consumptive users of the Channel Islands National Marine Sanctuary is one part of a larger effort to create the first spatially-explicit database of recreational boaters and their activities in the Channel Islands. Data in the database will correspond to use patterns and related activities, characteristics of boats and boaters, and how much boaters know about the sanctuary and where they acquire their information about it. In addition, expenditure data will provide insights about how much money boaters spend in the local economy and how those expenditures relate to specific areas and features of the sanctuary. These data will help us model and understand how the values held by non-consumptive users depend on the biophysical resources that MPAs seek to protect. The result will enhance opportunities for managers and policymakers to include humans in their approach to adaptive management of MPAs, an objective that is clearly aligned with the COPA objective of integrating ecosystem-based management (EBM) principals into state agency operations.

Fine-scale spatial data help demonstrate how the sanctuary's biophysical attributes, some of which are directly affected by MPAs, influence where boaters go, what they do, and how they perceive the experience. With these data we can begin the process of statistically identifying which attributes explain boater behavior and motivations. These data can also be used to anticipate and address management issues related to crowding, user conflicts, and human impacts to habitats inside and outside MPAs. Ultimately, they will contribute to an understanding of whether potential improvements in the value of non-consumptive uses in marine areas will be realized as hoped for or anticipated.

Summary data for 29 boaters surveyed over the fourth of July weekend, 2006 are presented here on the right. All the boaters surveyed identified themselves as "White/Caucasian" and were male. The average age for the 29 respondents was 55. Thirteen of the boaters interviewed were traveling in a power boat, 15 in a sailboat, and on in a motorsail. The average boat length was 41 feet. Respondents engaged in an average of around 6 different activities (of 14 total listed in the survey) in their trips to the Channel Islands. Respondents had planned their trips to include anywhere from only one anchorage to up to 6 anchorages.

It is expected that the study of spatial use patterns in the Channel Islands will result in:

1. Spatial data collection that is of relatively fine resolution acquired by surveying non-consumptive users in person and immediately following the completion of their non-consumptive use activities at specific sites
2. Reduction in measurement error conferred through querying private boaters about activities that they undertook during the recent past while at a location that is virtually the same or within several nautical miles of the location where the activity in question took place.
3. Surveying of non-local boaters that come to the Channel Islands from outside Ventura or Santa Barbara Counties.

The data collected through the spatial use patterns study in combination with the results of the larger study of private boating in the Channel Islands will result in the first database of private boaters and their non-consumptive activities, an understanding of the contribution to local economy and values held by non-consumptive users, and an opportunity to apply an understanding of this aspect of human-sanctuary interactions to adaptive management. As such, it is directly relevant to the Sanctuary's commitment to socioeconomic monitoring and several guiding principals and overall objectives of COPA.

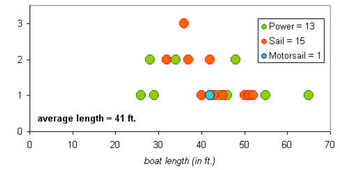
Demographic profile (n = 29)

29 White
29 Male
Average Age = 55 years

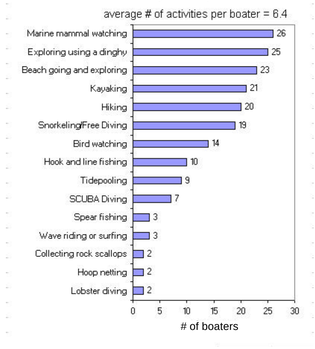
Income Categories for Respondents

$60,000 - $90,000	4
$90,000 - $120,000	3
$120,000 - $150,000	2
$150,000 - $180,000	4
$180,000 - $210,000	3
more than $210,000	10
decline to answer	3

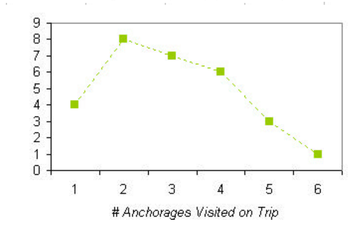
Boat Type and Length for Respondents



Activities within the Sanctuary for Respondents



Number of Anchorages Visted per Trip (# of boaters)



ACKNOWLEDGEMENTS
We appreciate the thoughtful and diligent contributions to this research made by Ryan Vaughn (UCLA doctoral candidate), Allison Chan (NaturalEquity), and Erin Gaines (NOAA Hollings Intern). We also acknowledge custom modification of the Oceanmap program performed by Peter Black of Environmental Defense.